FIRE PREVENTION

Safety Training Goal: Understand the principal types of fire hazards and how to prevent common fire hazards, and know the different types and purposes of fire extinguishers and how to use them for small fires.

Section I. Fire Hazards.

1. Introduction.

a. Fire can be a friend in a controlled situation - like in a fireplace on a cold night, or cooking on a barbecue grill. But nothing can be as terrifying as fire when it's out of control. The best way to control fires in the workplace is to prevent them from happening in the first place. The dangers of fire are not simply death or serious injury from being burned. Fire can also:

(1) Cause suffocation, by consuming the oxygen from the air.

(2) Release toxic vapors, by reacting with chemicals.

(3) Cause explosions by combining with explosive materials.

b. Basic Ingredients of Fire. Fire needs three basic things in order to burn:

(1) Fuel-this means anything that can burn, such as wood or paper, and includes flammable liquids such as gasoline and other petroleum-based products.

(2) Oxygen-just as we need oxygen to breathe, so does fire.

(3) Heat-this can be generated by flame, electricity, friction, or chemical reaction.

(The secret to preventing fires is to make sure that these three ingredients don't get together).

2. Discussion.

a. Types of Fire Hazards.

(1) The leading cause of workplace fires is electrical equipment. Examples of electrical equipment that can cause fires include:

(a) Damaged electrical cords and wiring.

(b) Defective electric tools that spark.

(c) Overloaded circuits.

(d) Loose electrical connections.

(e) Hot lights or machinery that comes in contact with flammable material.

(2) Some other common sources of fire in the workplace include:

(a) Smoking.

(b) Space heaters.

(c) Welding and cutting operations.

(d) Spontaneous combustion.

(e) Chemical reactions.

b. Protecting Against Hazards.

(1) Since electrical equipment is the leading cause of workplace fires, it's important to focus on how to prevent electrical fires:

(a) Don't use damaged or defective electrical cords or tools.

(b) Don't overload circuits or outlets, such as by plugging too many cords into one outlet.

(c) Don't let flammable materials get close to electrical equipment or machinery.

(d) Make sure grounding connections work, since these keep electric current flowing on a safe path.

(2) Another major fire hazard is toxic vapors and explosions that might result if fire contacts chemicals. Here are some tips for preventing these hazards:

(a) Find out if a liquid chemical is flammable by checking the MSDS or container label.

(b) Use flammable liquids only in a well-ventilated area.

(c) Don't use flammable liquids near sources of flame or heat.

(d) Store flammable liquids in approved, airtight metal containers.

(e) Promptly clean up any spills and dispose properly.

(3) Finally, good housekeeping is critically important in preventing fires. This simply means making sure that all flammable and combustible materials are kept away from sources of ignition. Ways to do this include:

(a) Cleaning up flammable scraps, sawdust, etc., and disposing properly; keeping dust and debris off machinery and electrical equipment.

(b) Storing all flammable materials properly.

(c) Enforcing no smoking rules.

(d) Following company rules and procedures.

3. Conclusion. In spite of all that can be done to prevent fires, they sometimes happen. If a fire breaks out, employees should know the proper responses. If they have been properly trained to fight fires, they should respond as appropriate. Otherwise, employees should be trained to:

a. Recognize the sound of a fire alarm.

b. Turn off energized equipment.

c. Close any windows not used for escape (this helps reduce the flow of oxygen).

d. Evacuate the area, quickly but calmly, by the proper escape route in accordance with the company's emergency action plan.

Section II. Using a Fire Extinguisher

1. Introduction.

a. As a general rule, fighting fires is best left to professionals who have been extensively trained in fire fighting. A large fire raging out of control is no place for amateurs. If a major fire ever happens, the best thing for most employees to do is to make sure that emergency response personnel are notified and to evacuate the area.

b. But sometimes, we have no choice but to do the best we can with the equipment we have on hand. This is especially true of very small fires that can be put out using an appropriate fire extinguisher.

c. Note the word "appropriate," because it's very important: Not all fire extinguishers are designed to do the same job, and using the wrong type of fire extinguisher can make a bad situation worse. That's why it's important for every employee to know which types of fire extinguishers to use in different situations, as well as how to use them properly. Generally speaking, OSHA requires companies to:

(1) Have the right types of fire extinguishers in the workplace.

(2) Make sure they're in proper working order through monthly inspections and annual maintenance.

(3) Make sure employees know where they are and how to use them.

2. Discussion.

a. Types and Uses of Extinguishers. There are five main types, or classes, of fire extinguishers:

(1) Class A. These are for ordinary combustibles like wood chips, paper, clothing, and trash that don't contain flammable substances like gasoline, solvents, or some other chemicals.

(a) Class A extinguishers use water or water-based liquid, foam, or dry chemicals. Using a Class A extinguisher on fires involving flammable liquids or electricity can be anything from not very effective to positively dangerous, so be sure to use Class A extinguishers only on Class A type fires.

(b) Class A extinguishers have numbers like 1-A, 2-A and so on. The numbers indicate how large a fire the extinguisher can handle. A 2-A extinguisher handles twice as large a fire as a 1-A, and a 3-A handles a fire three times the size of a 1-A.

(2) Class B. These are for fires involving flammable liquids like gasoline, oil, solvents, paint, and grease. They contain carbon dioxide, foam, or dry chemicals. They work by cutting off the supply of oxygen and smothering the fire. Class B extinguishers also have numbers to show how large a fire they can handle, but the numbering system is slightly different from that of Class A. In the Class B system, a 5-B can handle a five-square-foot fire, a 10-B can handle a 10-square-foot-fire, and so on.

(3) Class C. These are for fires involving or surrounding electrical equipment, and they work with carbon dioxide or dry chemicals to smother the fire. These extinguish-ers do not have a numbering system.

(4) Class D. These are special purpose extinguishers for combustible metals such as sodium, magnesium, zinc, and powdered aluminum. They are required to be available in operations that generate these types of metal powders, flakes, or shavings.

(5) Combination Classes-Such as "ABC" or "BC." These extinguishers are designed to fight combinations of the first three types of fires discussed.

b. Using a Fire Extinguisher.

(1) Actually using a fire extinguisher is fairly simple:

(a) Pull the pin.

(b) Stand about eight feet from the fire.

(c) Aim at the base of the fire.

(d) Squeeze the trigger.

(2) But, there are some very important safety procedures to keep in mind when using a fire extinguisher:

(a) Know where fire extinguishers are located.

(b) Make sure you're using the right class and capacity of extinguisher for the fire you're fighting.

(c) Be sure of your aim, since most extinguishers only last for a few seconds.

(d) In the case of typical Class A fires, such as wastebasket fires, be careful not to blow burning objects around.

(e) Never use water to fight an electrical or flammable liquid fire. Water conducts electricity, and will act to spread the fire rather than put it out.

3. Conclusion

As an important reminder, remember that a training session in the proper use of fire extinguishers is not the same as being professionally trained as a firefighter. Fires are dangerous, and should be fought only by people who are positive that they know what they're doing. If there's a chance they might make a bad situation worse, employees are better off notifying and then getting out of the way of qualified emergency response personnel.

Hidden Fire Hazards

Preventing Fires from...

Electricity:

DO...

- **Replace** wires when insulation gets frayed or worn. Otherwise they might create excess heat, causing fire.
- **Use** the correct fuse for the job. A fuse that has too much capacity could permit a dangerous, fire-starting overload.
- **Use** extension cords that are in good condition and adequate for the task. One in poor condition or that is underrated might heat up and start a fire.
- **Check** that ground connections are sound. A proper ground provides a safe path for electricity if something goes wrong.
- **Keep** combustible materials away from lights and machinery.

DON'T...

- **Don't use** temporary wiring.
- **Don't overload** motors, circuits, and outlets.
- **Don't leave** heating equipment or machinery running unattended or overnight.

Deadly Vapors from Flammable Liquids:

DO...

- **Keep** away from heat and cigarettes.
- **Use** only in areas with good ventilation.
- **Store** in approved metal containers—never anything breakable.
- **Ground** containers when transferring materials to prevent static electricity as an ignition source.
- **Take out** only what you need for a job.
- **Clean** up spills and leaks quickly.
- **Remove** clothing that has absorbed liquids immediately.

DON'T...

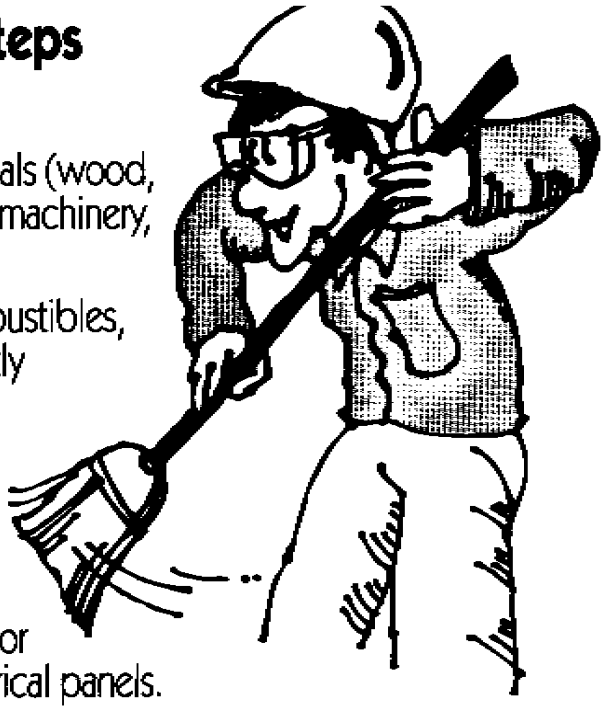
- **Don't Store** "empty" flammable liquid containers near ignition sources unless they've been tested and OK'd for a job. Just a few drops of leftover liquid can cause a fire.
- **Don't ever cut** a drum or container that contained gasoline or other flammable liquids for the same reason.

Be sure you recognize your company's fire alarm signal. When you hear it, follow your company's emergency plan and...

- **Turn** off equipment.
- **Close** non-escape windows.
- **Evacuate** by the route and to the place assigned to you.

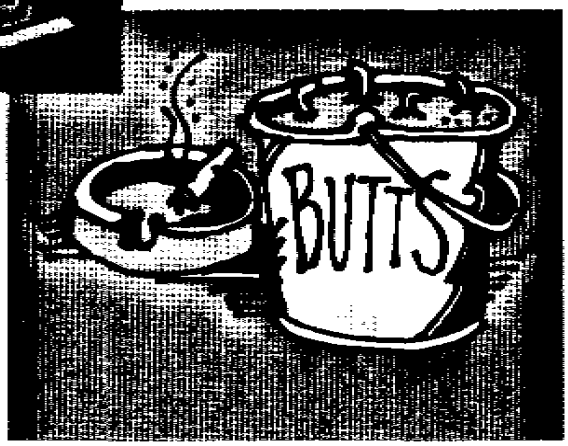
Poor Housekeeping Is Playing With Fire

Follow these good housekeeping steps to avoid fire and explosion:



- **Keep** combustible and flammable materials (wood, paper, gas,oil, chemicals) away from lights, machinery, or other heat sources.

- **Dispose** of combustibles, like oily rags, in tightly covered metal containers.
- **Store** all flammable liquids properly. Never store combustibles or flammables in electrical panels.
- **Keep** motors and machines free of dust and grease.



- **Smoke** only in designated areas.
- **Practice** preventive maintenance on all electrical equipment.
- **Keep** all storage areas clean and free of debris.

WORKSITE FIRE EMERGENCIES

Know What to Do

If the worst should happen and a fire did start at your worksite, would you know what to do? Knowing how to react in a fire emergency can literally mean the difference between life and death.

Your First Move

Many small and self-contained fires can be safely extinguished on the spot. But if you are in any doubt as to the seriousness of the fire, sound the fire alarm immediately and begin evacuating the building. Know where fire alarm boxes are situated throughout your workplace, learn your company's evacuation procedures and know the locations of established escape routes.

Fighting Small Fires

If you are *certain* that a small or self-contained fire does not pose an immediate threat to you, your co-workers or the surrounding area, you may be able to put it out with the *appropriate* fire extinguisher. There are many varieties of fire extinguishers, but each is rated according to the types of fires it can put out. Before you use an extinguisher, check to see if it is rated for the type of fire you are confronting. (This information must be labeled on the extinguisher itself.) Please—don't wait for a fire to learn where fire extinguishers are located and what ratings they carry. And before you find yourself in a fire emergency, take a moment to learn the four basic types of fires.

Four Types of Fires

Type A: Wood, paper, cloth, rubbish

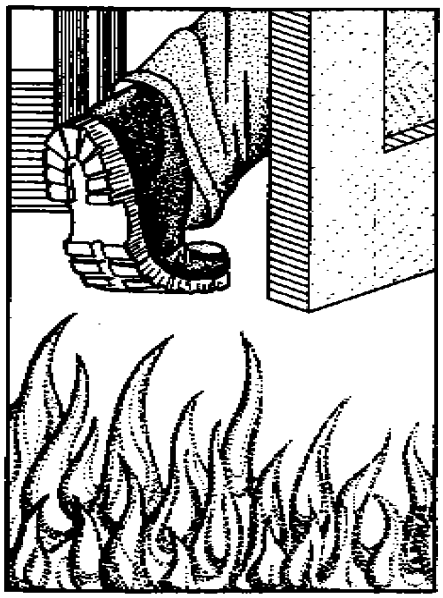
Type B: Flammable gas/liquids (like oil, grease, paint)

Type C: Electrical fires

Type D: Combustible metals

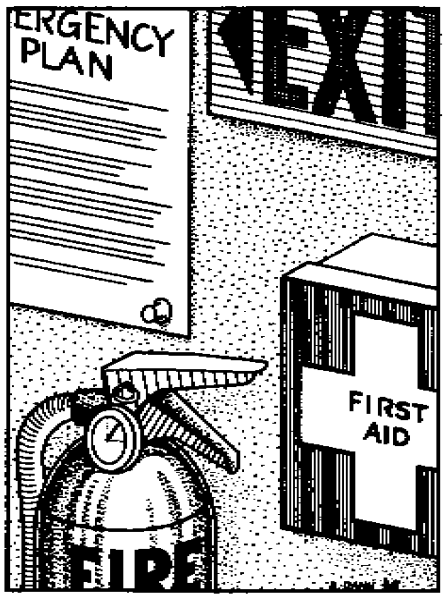
Remember

Your safety comes first. If you are in doubt about the seriousness of any fire, don't hesitate—sound the alarm and leave the premises.



Know the locations of fire alarms and emergency exits.

Check extinguisher to see if it is rated to put out the type of fire you are confronting.



WORKSITE FIRE EMERGENCIES

What To Do When Fire Breaks Out

If the worst should happen and a fire did break out at your worksite, would you know what to do? Knowing how to react in a fire emergency can literally mean the difference between life and death.

Your First Move

Many small and self-contained fires can be safely extinguished on the spot. However, if you are in any doubt as to the seriousness of the fire, sound the fire alarm immediately and begin evacuating the building. Know where fire alarm boxes are situated throughout your workplace, learn your company's evacuation procedures, and know the locations of established escape routes.

Fighting Small Fires

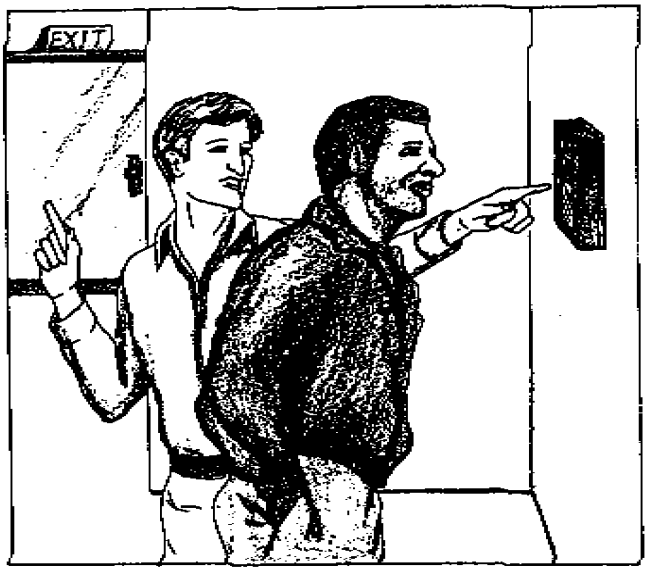
If you are *certain* that a small or self-contained fire does not pose an immediate threat to you, your coworkers, or the surrounding area, you may be able to put it out with the *appropriate* fire extinguisher. There are many varieties of fire extinguishers, but each is rated according to the type or types of fires it can put out. Before you use an extinguisher, check to see if it is rated for the type of fire you are confronting. (This information must be prominently listed on the extinguisher itself.) Please! Don't wait for a fire to learn where fire extinguishers are located and what ratings they carry. And, before you find yourself in a fire emergency, take a moment to learn the four basic types of fires.

Four Types Of Fires

Type A: Wood, paper, cloth, rubbish, etc.
Type B: Flammable gas/liquids (like oil, grease, paint)
Type C: Electrical fires
Type D: Combustible metals

Remember

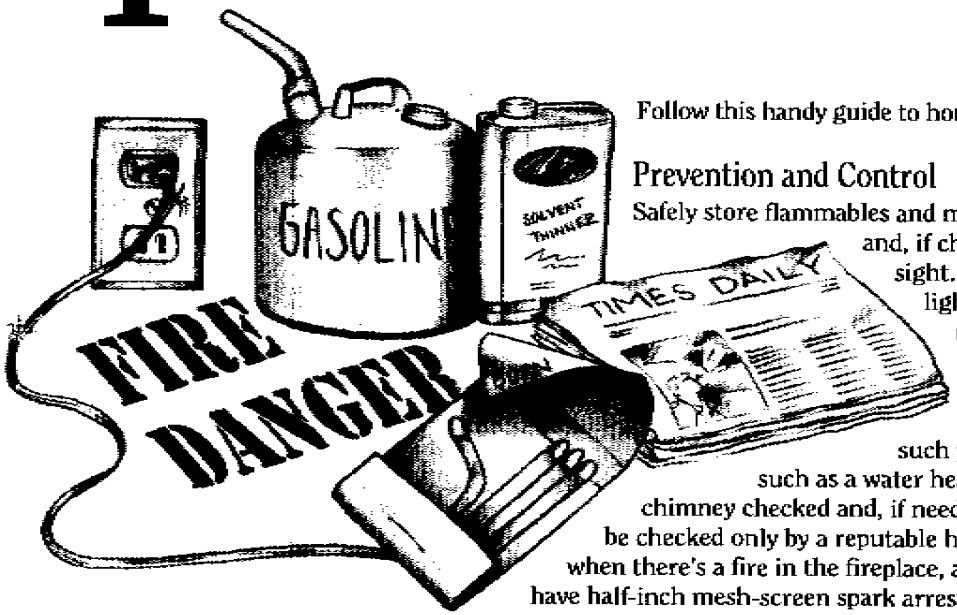
Your safety comes first. If you are in doubt about the seriousness of any fire, don't hesitate—sound the alarm and evacuate the premises.



Know the location of fire alarms and emergency exits.

Check extinguisher to see if it is rated to put out the type of fire you are confronting.

Is Your Home Fire Safe?



Follow this handy guide to home fire safety, prevention and control.

Prevention and Control

Safely store flammables and materials that could be used to start fires and, if children are present, keep them out of sight. These include matches, cigarette lighters, lighter fluid, cleaning fluid, paint, paint thinner and turpentine. Gasoline and solvents should be stored in approved safety cans, preferably in an unattached shed or garage. Be particularly careful not to put such products near a source of flame or a spark, such as a water heater or a furnace. Have your furnace and chimney checked and, if needed, cleaned annually. The furnace should be checked only by a reputable heating contractor. Always use a fire screen when there's a fire in the fireplace, and the chimney and stovepipe should have half-inch mesh-screen spark arresters.

Install smoke detectors in or near bedrooms or in hallways and change the batteries every six months—or sooner if needed. Check them monthly. (A smoke detector with working batteries doubles your chances of surviving a fire.) Keep a multipurpose (ABC-type) fire extinguisher handy, particularly for kitchen fires and near a working fireplace, and learn how to use it. Make sure any security bars or grilles on windows or doors can be opened easily from the inside, especially those over bedroom windows. If you don't have a fire escape, keep portable escape ladders on the upper floors of your home.

Keep kitchen curtains and dish towels away from the range burners. Likewise, don't drape bath towels too close to a wall heater. Keep portable heaters at least 3 feet from anything flammable, and don't drape anything over them. Keep ovens, range hoods, ventilation ducts and microwave ovens free of grease.

Electrical Precautions

Don't overload electrical outlets or power strips past the power capacity of each circuit. Keep power cords in good condition and try to avoid extension cords. Replace frayed or cracked cords and never run cords under rugs. Don't place a penny behind a burned-out fuse in an attempt to extend its life and don't exceed the wattage capacity of lamps and light fixtures. When in doubt, use a 60-watt bulb.

Cleaning Improves Your Safety

Clean up and haul away rubbish, including newspapers, pieces of wood, rags and old tires. Merely piling such debris outside doesn't get rid of the problem. In fact, remove all flammable rubbish, debris and vegetation from at least 30 feet around your house and keep a 100-foot hose with a power nozzle handy. Keep the roof and roof gutters clean of leaves and clear of branches. Inspect the mesh over your chimney and clear any branches at least 10 feet from the chimney. Keep your property well lit to discourage arsonists.

PASS the Fire Extinguisher

An easy way to help you remember how to use a fire extinguisher is to think of the acronym PASS:

P—Pull the safety pin.
A—Aim at the base of the flame.
S—Squeeze the handle.
S—Sweep back and forth and up and down.

Check the pressure gauge on your fire extinguisher once a month to make sure it's fully charged. A nonrechargeable fire extinguisher should last about 12 years. Rechargeable ones usually last about six years between rechargings. A typical home fire extinguisher discharges in less than 10 seconds. An extinguisher is never a substitute for calling the fire department, even if you think the fire is out.

Smoke Detectors Save Lives

If there's one word you should always associate with smoke detectors, it's BATTERIES! A smoke detector with working batteries doubles your chances of surviving a fire. The devices are also inexpensive, convenient and easy to install, yet it's estimated that as many as half of the smoke detectors in U.S. homes don't work because of old or missing batteries.

Maintaining Your Best Fire Protection

Some models of smoke detectors are powered by the electrical current in the house rather than by batteries, but their wires can get disconnected or the circuit can short out. So all models need to be checked at least monthly. All smoke detectors made after Dec. 1, 1979, have an alarm test button that, when pressed, causes the horn to sound if the power is sufficient. Some models also make a chirping noise when their power is getting low. Don't try to test a detector by standing on something and blowing or wafting smoke into it or holding a lighted match up to it. The test button is a safer indication of the device's effectiveness.

Replace the batteries every six months but at least once a year, even if the warning device for weak batteries has not sounded. A good way to remember to change smoke detector batteries is to tie it in with turning back the clocks for the beginning of standard time every October. It's also important to keep the detector clean by vacuuming it, but don't remove its cover while doing so.

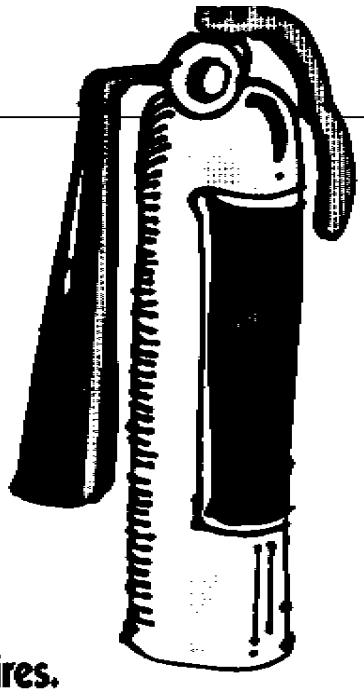
Where to Place Smoke Detectors

Place smoke detectors on the ceiling, at least 6 inches from walls and well away from vent screens. The most effective locations for smoke detectors are on every level of your home and in or near areas of fire or smoke danger: the basement, stairwells and hallways near bedrooms. The more smoke detectors you install, the higher your level of protection. However, smoke detectors are not recommended for kitchens, bathrooms, garages, attics or near windows, doors, fireplaces or air conditioners. You might experience too many false alarms.

A smoke detector with working batteries doubles your chances of surviving a fire.

If you do experience false alarms, perhaps from a smoking cigarette or burning toast, don't give in to the temptation to disconnect the smoke detector. You may forget to reconnect it later. Simply fanning the smoke away from the detector and increasing the ventilation of fresh air in the room will usually stop the alarm.

Fire Extinguishers: A Class Act

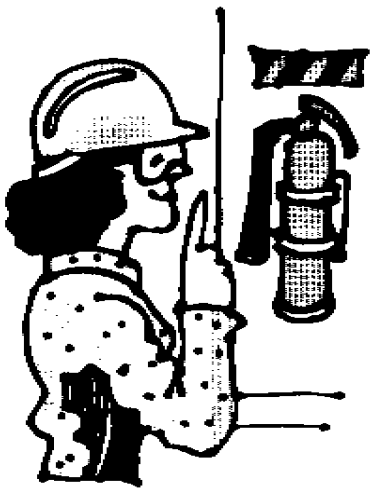


Most extinguishers are classified either:

- **A** for fires involving combustibles like wood or paper
- **B** for flammable liquids, gases, and gasoline
- **C** for electrical wiring and equipment
- **ABC** for combination fires
- **D** for combustible metals like magnesium, sodium.

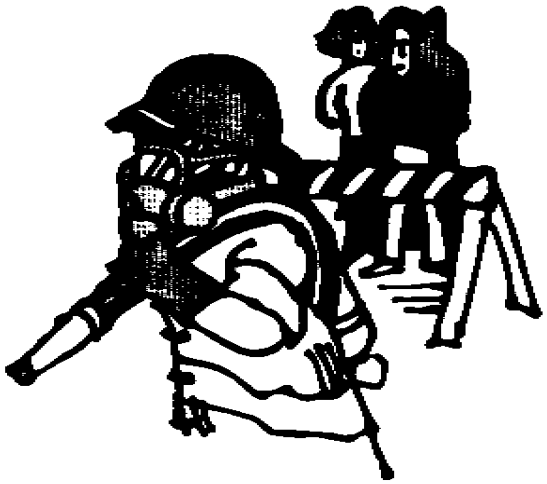
- **Use higher number Class A extinguishers for larger fires.**
- **The numbers on Class B extinguishers tell the square-foot area they are effective in.**

Know the location of fire extinguishers.



If you haven't been assigned firefighting responsibilities—get out of the area, so trained people can do their job.

If you're on the firefighting team—follow your company's contingency plan and SOPs. Make sure you are wearing the proper protective clothing and respirator before you approach a fire.



Give It Your Best Shot: How to Use a Fire Extinguisher

Pull the pin, stand back about 8 feet, aim the hose at the base of the fire, and squeeze the trigger.

Make sure your first shot is on target—the fire extinguisher only lasts 3 to 20 seconds.

- **Make sure** you don't blow burning papers out of wastebasket fires.
- **Never** put water on an electrical fire or piece of electrical equipment.
- **Don't** attempt to fight a fire that is too big for you!